STSW-MKSBOX1_BL

Data brief

SensorTile.box firmware OTA function restore

Features

- Restores FOTA functionality deleted by custom firmware.
- Requires the following:
  - STEVAL-MKSBOX1V1 (SensorTile.box) board
  - Mini USB B to USB-B cable
  - Micro USB-B to USB-B cable
  - ST-LINK/V2 programmer with correct driver installed on PC
  - STM32 ST-LINK Utility (STSW-LINK004) software installed on PC
  - Smartphone with ST BLE Sensor app installed
  - JTAG adapter board V1.0: adapter from JTAG20 to STDC14 connector
  - Flat cable to connect JTAG adapter to SensorTile.box
  - BLEFOTA_BL.bin firmware file

Description

The STEVAL-MKSBOX1V1 (SensorTile.box) is a ready-to-use wireless IoT and wearable sensor box kit designed to help simplify app development based on remote motion and environmental sensor data.

The kit firmware provides a range of development modes: from Entry Mode for developers with little or no programming skills, to Pro Mode where users can load custom firmware on the SensorTile.box STM32 microcontroller.

The STSW-MKSBOX1_BL firmware allows you to restore the ability to upgrade firmware over the air (FOTA) in the event that FOTA functionality is overwritten or deleted due to a custom firmware upload.

Product summary	
Firmware OTA restore for SensorTile.box	STSW-MKSBOX1_BL
Wireless multi sensor development kit for IoT and wearable sensor applications	STEVAL-MKSBOX1V1
ST-LINK/V2 in-circuit debugger/programmer for STM8 and STM32	ST-LINK/V2
STM32 ST-LINK utility	STSW-LINK004
ST-LINK, ST-LINK/V2, ST-LINK/V2-1, STLINK-V3 boards firmware upgrade	STSW-LINK007
ST-LINK/V2-1 USB driver on Windows Vista, 7 and 8	STSW-LINK008
ST-LINK, ST-LINK/V2, ST-LINK/V2-1 USB driver signed for Windows7, Windows8, Windows10	STSW-LINK009

Product summary	
Applications	IoT for Smart Things IoT for Smart Home and City Wearable

1 FOTA restore procedure

1.1 Connect the hardware

Step 1. Connect the JTAG adapter to the ST-LINK/V2 programmer and debugger.

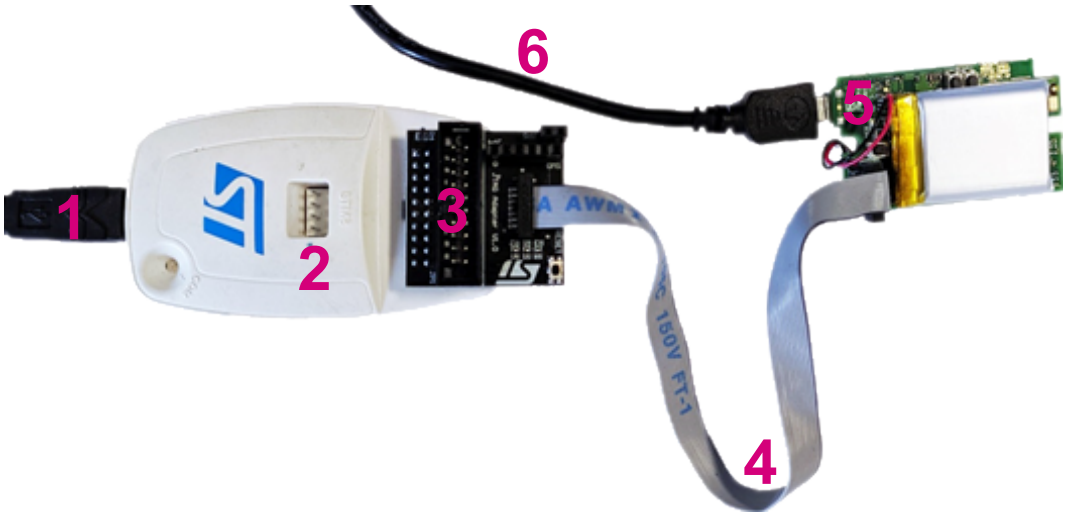
Step 2. Connect the flat cable between the ST-LINK programmer/debugger and SensorTile.box. Pin 1 is labeled on both parts and should be connected with the cable pin 1 (black wire).

Step 3. Supply USB power (PC or wall charger) to the SensorTile.cox board via a microUSB-B cable.

Step 4. Connect the ST-LINK/V2 to the PC via USB cable.

Figure 1. Connecting the SensorTile.box, JTAG adapter and ST-LINK programmer

1. PC-USB
2. ST-LINK/V2
3. JTAG adapter
4. Flat cable
5. SensorTile.box
6. DC power USB



1.2 Run the STM32 ST-LINK Utility software

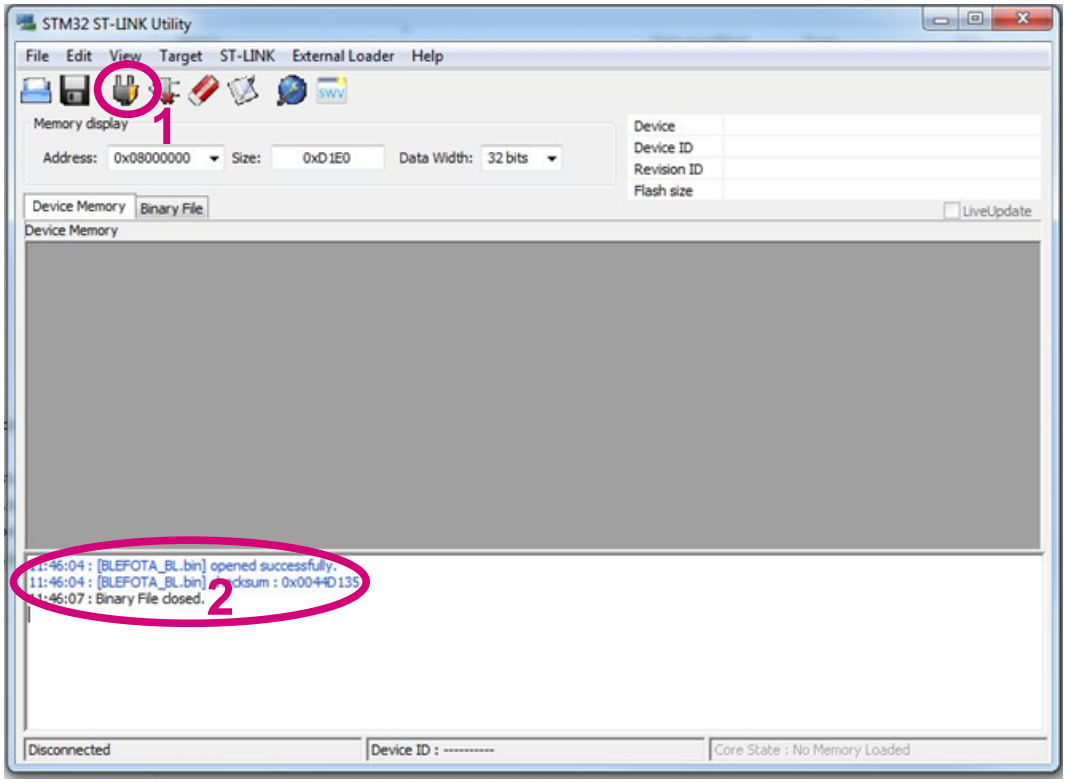
You can perform this step after the hardware components are connected and powered appropriately.

Step 1. Run the STM32 ST-LINK Utility software and select the [**connect to target**] icon.

The software displays the current binary file flashed in the STM32 microcontroller of the SensorTile.box board.

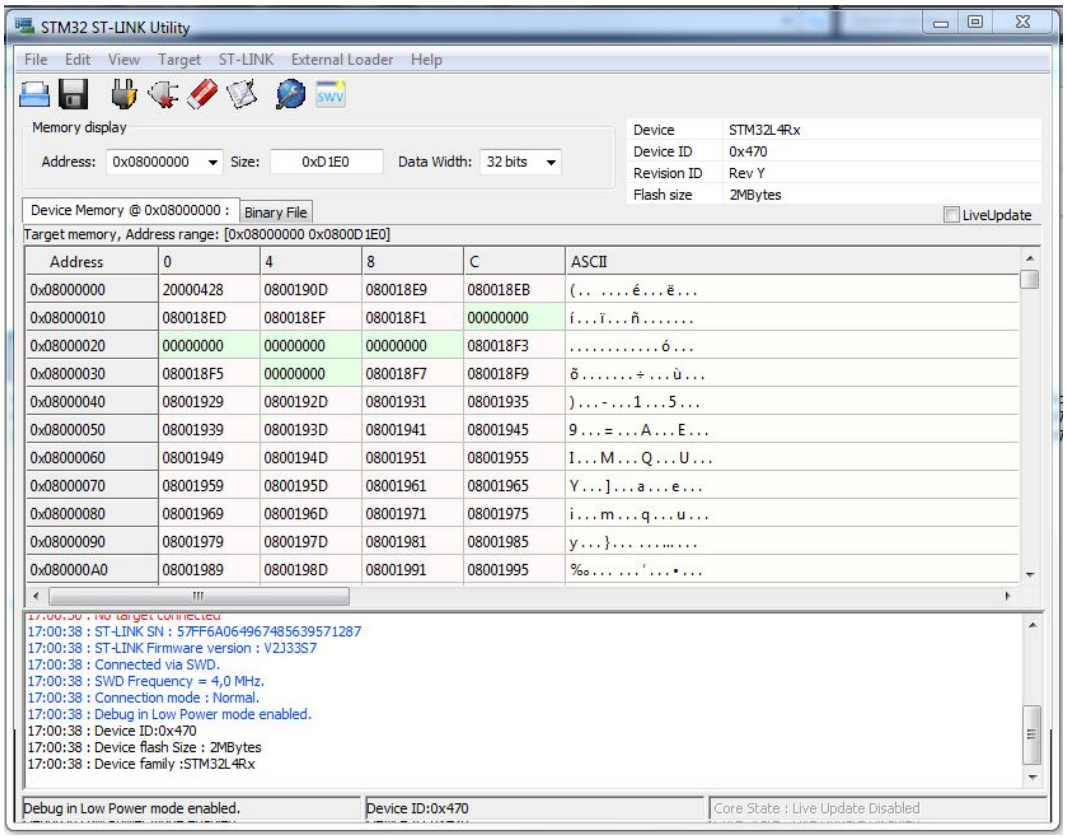
Figure 2. STM32 ST-LINK Utility software connection with target SensorTile.box

1. connect to target icon
2. current binary file flashed on MCU



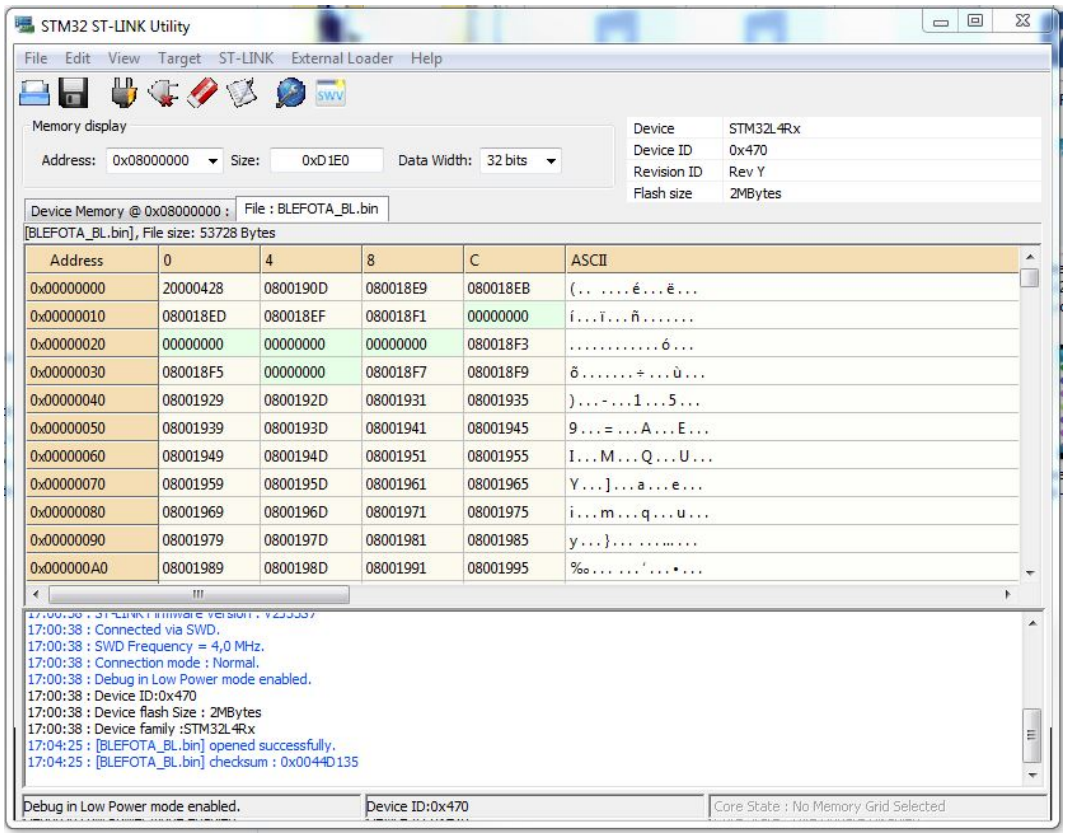
Step 2. Select [**Target**]>[**Erase chip**] to erase the entire STM32 flash memory.
This step is necessary to avoid any issues when the new binary file is flashed.

Figure 3. STM32 ST-LINK Utility software erase SensorTile.box flash



Step 3. Select [**File**]>[**Open File**] and select the BLEFOTA_BL.bin file on your PC.
This bootloader file enables FOTA via Bluetooth.

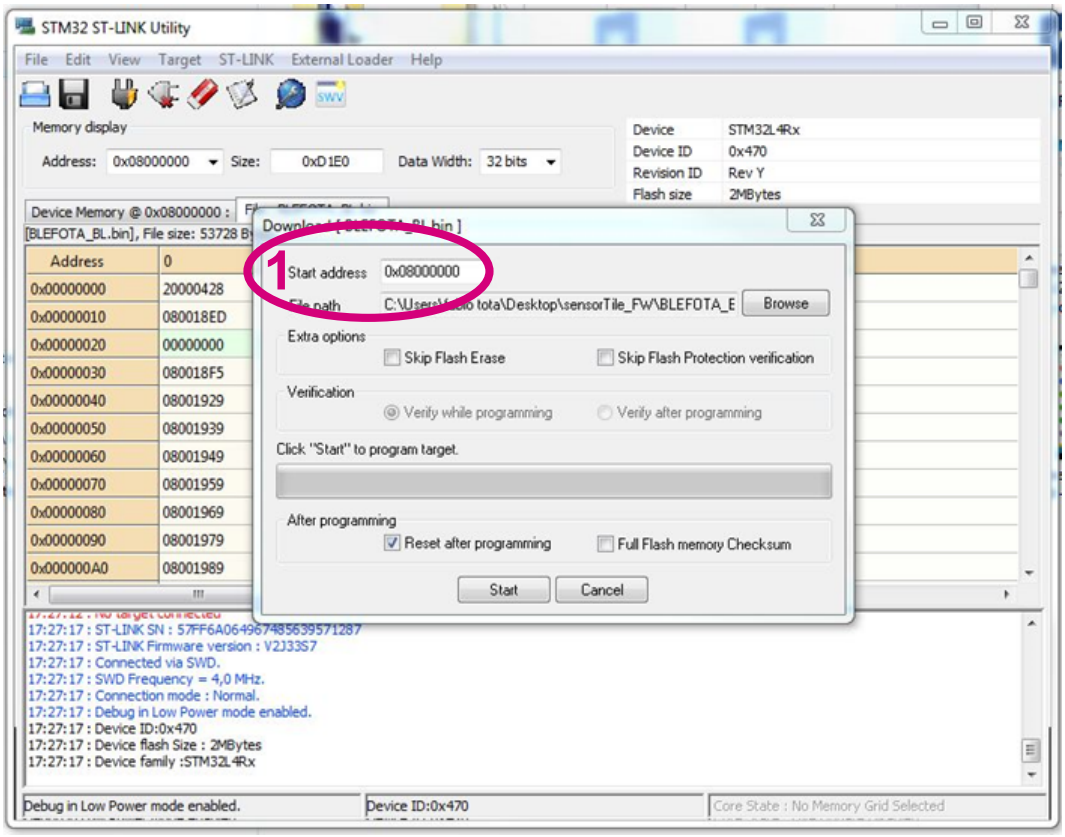
Figure 4. STM32 ST-LINK Utility software open FOTA via BLE bootloader file



Step 4. Select [**Target**]>[**Program**]
Ensure that the start address is 0x08000000.

Figure 5. STM32 ST-LINK Utility software load FOTA via BLE file

1. Start address



Step 5. Select [**Start**].

Once the flashing procedure is complete, the SensorTile.box can receive the latest firmware available from ST via a Bluetooth low energy connection with a smartphone.

1.3 Run the ST BLE Sensor smartphone app

You can perform this step after the BLEFOTA_BL.bin bootloader file is loaded on the SensorTile.box STM32 microcontroller.

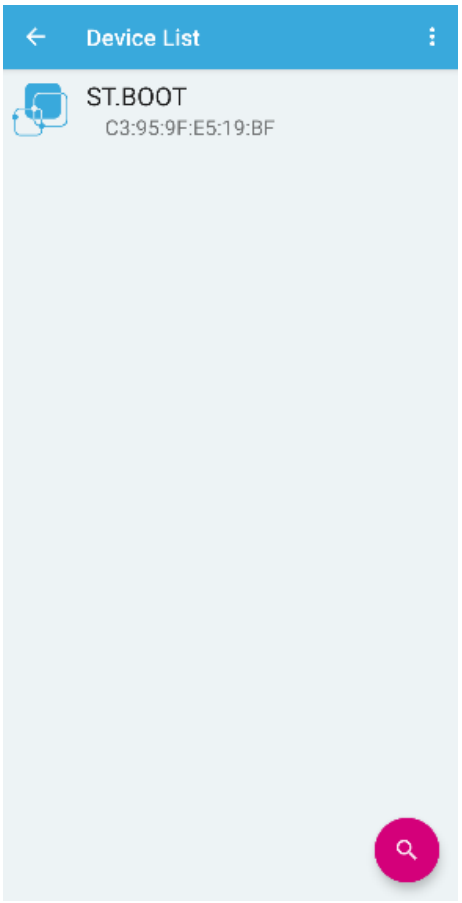
Step 1. Run the ST BLE Sensor smartphone app and delete any old Bluetooth pairings with the SensorTile.box board.

This helps avoid any communication issues between the smartphone application and the board.

Figure 6. ST BLE Sensor smartphone app

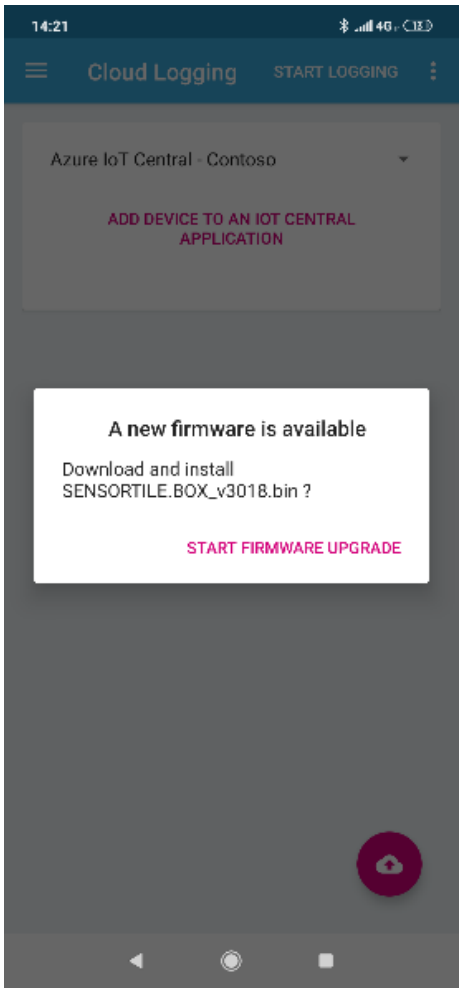
Step 2. Select [**CONNECT TO A DEVICE**].
The app identifies the SensorTile.box board running BLEFOTA_BL.bin as ST.BOOT

Figure 7. SensorTile.box with FOTA bootloader listing in ST BLE Sensor app



Step 3. Select [**ST.BOOT**] from the Device List.
The ST BLE Sensor app retrieves the latest firmware version available for the SensorTile.box.
If is the first time of device's phone connecting, is needed a Bluetooth connection pairing code: **123456**

Figure 8. New firmware availability for SensorTile.box



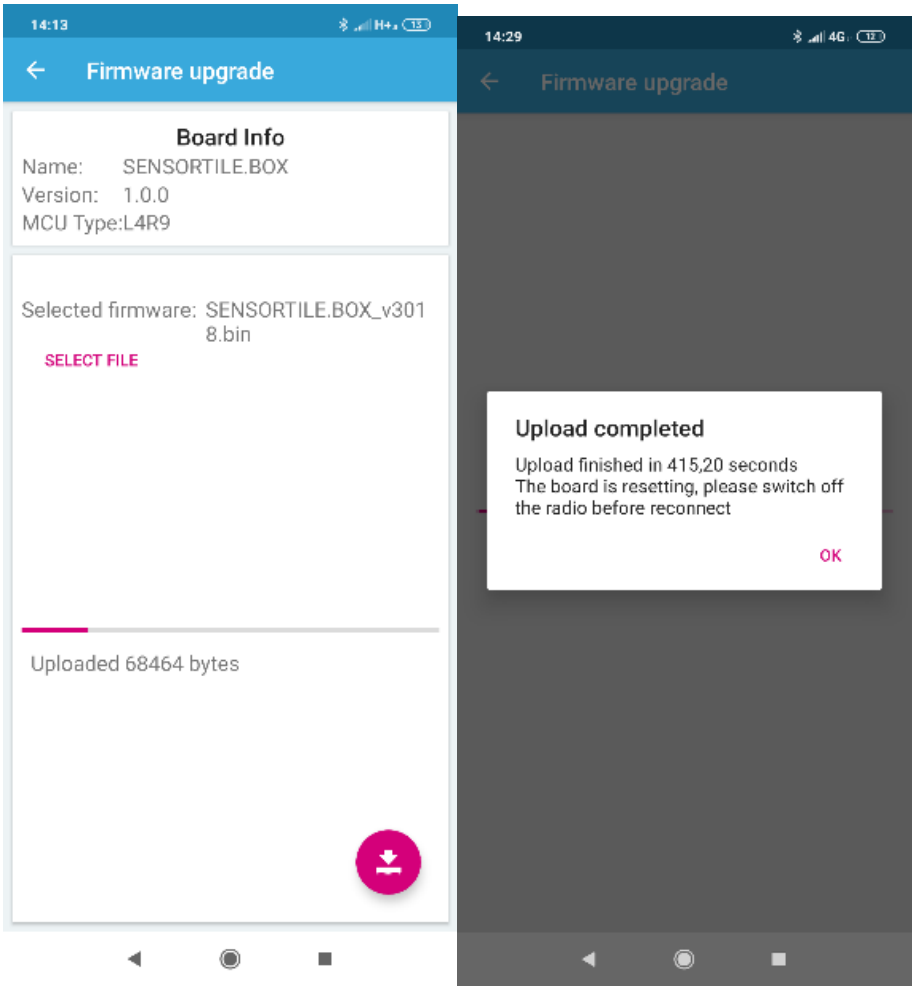
Step 4. Select [**START FIRMWARE UPGRADE**] followed by the download icon.

Figure 9. Download latest SensorTile.box firmware

1. Download icon

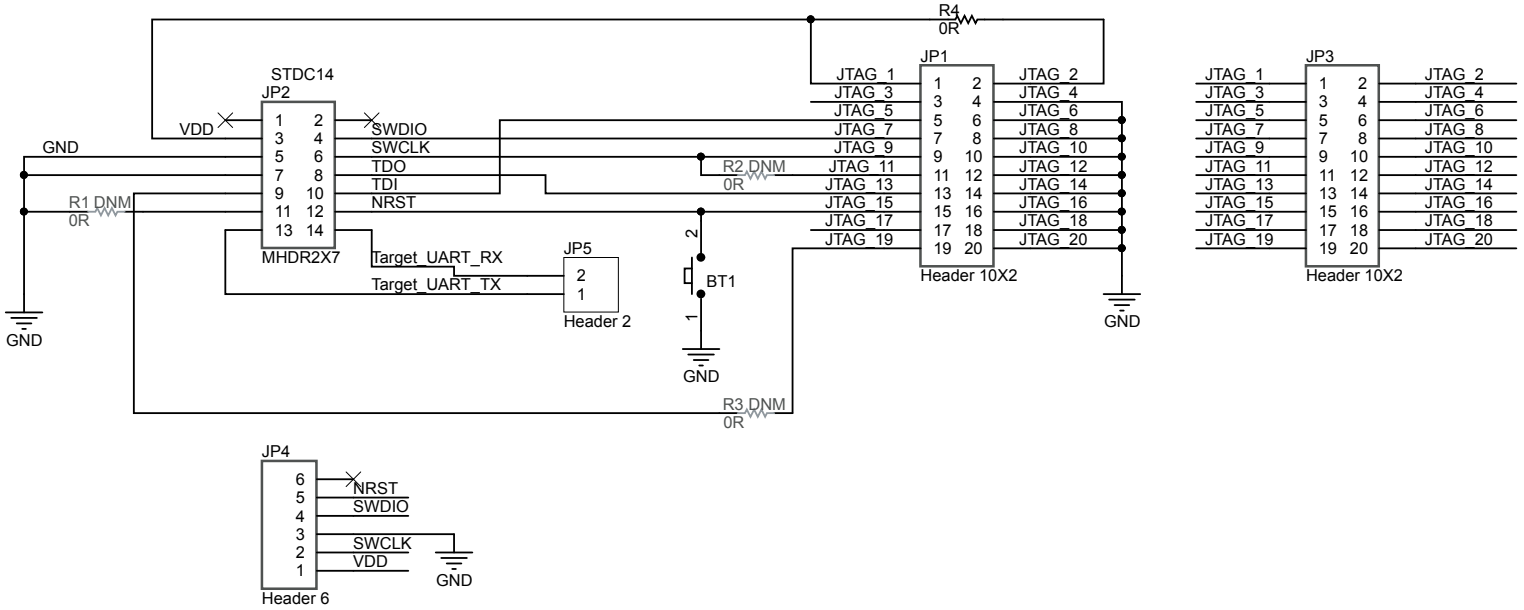
The app downloads the latest online version of the firmware onto the SensorTile.box STM32 MCU flash memory. The ST BLE Sensor app now identifies the board as TileBox.

Figure 10. STM32 ST-LINK Utility software load FOTA via BLE file



2 Schematic diagrams

Figure 11. STSW-MKSBOX1_BL schematic diagram



Revision history

Table 1. Document revision history

Date	Version	Changes
03-Sep-2019	1	Initial release.
13-Nov-2019	2	Added cover page image.
05-Dec-2019	3	Updated Section 1.3 Run the ST BLE Sensor smartphone app